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(54) WALLS FOR THE LOAD BEARING PLATFORMS OF COMMERCIAL VEHICLES

(71) We, THEODOR WUPPERMANN GESELLSCHAFT MIT BESCHRANKTER HAFTUNG, of 5090 Leverkusen 1, Postfach 1, Friedrichstrasse 38, Germany, a German Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to the walls of the load bearing platforms of commercial vehicles, which walls are assembled from at least two longitudinal section rails made of metal or of a synthetic resin.

The walls of the superstructures erected on the load bearing platforms of commercial vehicles are increasingly made of metal instead of being constructed from planed deal boards or planks as has hitherto been the practice, the aim being to reduce the net weight of the platform superstructure and, on the other hand, to reduce the manufacturing costs.

In commercial vehicles, the metal walls of box-shaped superstructures have hitherto either been produced from solid, thick steel plates provided with cold-rolled continuous, longitudinal stiffening corrugations, such steel plates being screwed to vertical bearing rails, or they may be produced from extruded light-metal sections which, in a manner similar to the planed deal boards or planks used in the wooden construction, are interconnected by groove-and-tongue joints and held together by an external frame. The construction of these metal walls in practice involves considerable difficulties, since the walls have generally to be constructed singly to meet the special requirements of customers. The known metal walls are thus no cheaper than wooden structures. Moreover, they afford no appreciable advantage as far as reduction in weight is concerned, particularly when the walls are produced from solid steel plates, since such plates have to be provided of a substantial thickness in order to meet the requirements with respect to resistance to bending and to indentation or bulging.

It has been proposed to facilitate the manufacture of steel side walls of individual length and height for use in platform superstructures, by assembling the walls from cold-rolled metal strips of uniform section which are re-inforced by welded-on pieces or by corrugations produced during the rolling operation. Two or more such steel-plate sections are welded together with an overlapping border strip to produce a wall of any desired height.

Apart from being a time-consuming operation involving considerable cost of labour decisively affecting the manufacturing cost of the steel side walls, welding has the additional disadvantage that the heat generated by the welding process produces in the individual steel-plate sections of the wall uncontrollable stresses which may lead to a warping of the wall. Moreover, the height of walls consisting of steel-plate strips welded together cannot be changed subsequently, and the replacement of damaged steel-plate strips by new steel-plate strips presents difficulties in walls of this construction.

It is an object of the invention to construct walls for the load bearing platforms of commercial vehicles which are assembled from individual strips of metal or of a synthetic resin, in such manner as to enable them to be assembled simply from individual section rails to provide the respective height required, it being possible for the height to be adjusted, if necessary or desired. Damaged section rails, of the wall may be replaced by new section rails, and while having a minimum thickness, the section rails afford the necessary resistance to bending and to indentation or bulging of

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the wall, at the same time permitting of distortion of the wall to a limited extent.

According to the invention, there is provided a commercial vehicle platform wall assembled from at least two longitudinal section rails made of metal or of a synthetic resin, in which one longitudinal edge of each metal or synthetic resin rail is provided with a continuous corrugation of trapezium-shaped section along the whole length of the rail, the sides or arms of the corrugation diverging in the direction of the opening, the other longitudinal edge being provided with one arm which extends parallel to the external arm of the longitudinal corrugation, said arm being slightly shorter than the external arm of the corrugation and being provided with an outwardly bent angular side edge, two or more section rails respectively being detachably interconnected by a connecting rail of open trapezium-shaped section whose arms of different lengths converge in the direction of the free ends, each connecting rail filling the cavity of the corrugation in which the single arm of the adjacent section rail is inserted so as to contact the external arm of the corrugation, the short arm of the connecting rail resting against the bent angular lateral edge of the external arm of the longitudinal corrugation, the longer arm of the connecting rail resting against the web of the longitudinal corrugation, its web forming an abutting surface for the heads of screws by which the section and connecting rails, held together by clamping action, are secured to bearing rails extending transversely of the longitudinal direction of the wall.

The section rails forming the main part of the wall may be of generally channel-shaped cross section and of small thickness yielding to torsional strain, but having a substantial resistance to bending and to indentation or bulging. Using the connecting rails of trapezium-shaped section and a few additional section rails for torminating the wall at the top and at the bottom, side and cross-walls of any desired height for the superstructures of platform lorries or trucks may be screwed together, and the height of such walls may be changed subsequently. Any damaged walls may be repaired without particular complication and costs. The fact that the section rails may be made of a synthetic resin instead of being made of metal is of particular importance.

Rubber sealing strips provided with beaded edges for sealing the gaps may advantageously be inserted between the arms of the section rails and the arms of the connecting rails which extend parallel to the arms of the section rails. The use of these sealing strips enables the construction of liquid-tight platform superstructures of commercial vehicles.

In platform superstructures of commercial vehicles, the bottom part of the section rails at the bottom of the wall form an arm curved or cranked in circular-arc fashion according to the chassis of the vehicle, by which arm the rail of the chassis of the vehicle is partially covered and sealed.

Platform superstructures of commercial vehicles may be provided with a section rail having a curved bottom section by which it may be mounted on the skirting-rail part of the top covering rail of the side wall of the vehicle, the upper longitudinal edge of that section rail forming a corrugation of dovetail section having two arms of different lengths for the attachment of section rails. The requirement of increasing the height of the side walls of commercial vehicles by superimposed walls for transporting specific goods may thus be met.

The invention also provides a commercial vehicle platform wall assembled from at least two longitudinal section rails made of metal or of a synthetic resin in which one longitudinal edge of each metal or synthetic resin rail is provided with a continuous corrugation of trapezium-shaped section along the whole length of the rail, the sides or arms of the corrugation diverging in the direction of the opening, and in which the other longitudinal edge of each section rail is formed with an integral connecting rail means of hollow trapezium-shaped section, the marginal portion of said other edge being bent back to correspond to the cross-sectional shape of the corrugation; two or more section rails being detachably interconnected by seating the connecting rail means of one section rail into the corrugation in the other section rail so that the connecting rail means fills the corrugation practically completely, the connecting rail means having an outer web forming an abutting surface for the heads of screws by which the section and connecting rails, held together by clamping action, are secured to bearing rails extending transversely of the longitudinal direction of the wall.

One development of the invention, in which the resistance to torsional stresses may be increased, consists in the free edge of the bent-back end of the section rail being wholly or partially welded to the section rail.

It may also be advantageous for contacting parts of the corrugation and the section rail end associated therewith to be joined by means of an adhesive.

Embodiments of the invention are hereinafter described, by way of example only, with reference to the accompanying drawings, in which:—

Figure 1 is a vertical section through a hinged side wall of a vehicle, in which the broken lines indicate a superimposed extension wall;

Figure 2 is a front elevation of a component strip of the side wall shown in Figure 1;

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Figure 3 shows, on an enlarged scale, a corresponding vertical section through a side wall of the vehicle, the side wall being assembled from only two intermediate section rails;

Figure 4 is a front view of one of the bearing rails of the side wall;

Figure 5 is an end view of a connecting rail of the side wall, which connecting rail is provided of a special construction;

Figure 6 is a vertical part-sectional elevation of a side wall, in which the gaps between the assembled section rails are sealed by rubber strips;

Figure 7 is a part-sectional elevation of the upper lateral edge section of the front or rear wall of the platform superstructure;

Figure 8 is a part-sectional elevation of the border rail of a side wall and mounted thereon, a section rail for the connection of an extension wall;

Figure 9 shows one of the section rails connected to the annular side rail of the vehicle chassis, the section rails forming the lower border of the front wall of the fixed side walls of a platform superstructure, and

Figure 10 is a vertical section through a hinged side wall of a modified construction of a vehicle.

The side wall shown in Figures 1 and 2 is assembled from three uniform, section rails 1, an upper border rail 2 of skirting-rail construction and a lower section rail 3, the lower section of the lateral edge of the section rail 3 extending to and covering the longitudinal section rail of the chassis 4 of the vehicle. All of the section rails 1, 2, 3 forming the side wall are screwed to bearing rails 5 which are provided at uniform or different intervals along the length of the side wall and extend over the entire height of the side wall. Welded to the bearing rails 5 are flat iron rails 6 whose sections below the side wall are rolled into hinge eyes 6a.

The lower longitudinal edge of the individual section rails 1, which together form the intermediate part of the hinged side wall, is constructed as a trapezium-shaped corrugation with sides or arms 1b, 1c converging in the direction of the base 1a of the corrugation. The upper longitudinal edge of the section rail 1 is bent over to form an arm 1d extending substantially parallel to the arm 1c, the arm 1d being shorter than the arm 1c and provided at its lateral edge with an angular bend 1e. It will be noted from Figure 3 particularly that the angular bend 1e serves as a stop for one arm 7c of an intermediate rail 7 of U-shaped cross-section with which two adjacent section rails 1 are interlocked and screwed to the bearing rails 5.

Two adjacent section rails 1 are interconnected by introducing the upper arm 1d of one section rail 1 into the longitudinal corrugation 1a, 1b, 1c of the lower edge of the next section rail until it contacts the bottom external arm 1c of the corrugation. The connecting rail 7 is then introduced into the clearance of the corrugation, the arm 7c of the connecting rail 7, coming to lie flat on the arm 1c of the lower section rail 1, contacting the angular bend 1e, its slightly longer other arm 7b, coming to lie against the inside of the arm 1b of the longitudinal corrugation of the next higher section rail 1, contacting the base 1a of the corrugation. The web 7a of the connecting rail 7 of trapezium-shaped section, the arms 7b, 7c of which converge in the direction of the free ends when the connecting rail is properly inserted between two adjacent section rails 1, lies flush with the plane wall sections of the section rails 1.

In Figures 1 to 3 the longitudinal edge of the arms 7b, 7c of the connecting rails 7 rest respectively against the web 1a of the corrugations and the angular bend 1e of two joined section rails 1. Since the parts may be prematurely worn by rubbing against each other, the lateral edges 7b′ and 7c′ of the arms are advantageously bent at an angle inwardly as shown in Figure 5, so that narrow surface areas of the arms come to lie against the web 1a of the corrugation and against the angular bent part of the section rails respectively.

In the manner hereinbefore described the section rails 1 are detachably secured to the bearing rails 5 by cap screws 8 and nuts 9 with the aid of the connecting rails 7 acting as clamping elements. The bearing rails have the profile of a capital M as shown in Figure 4 in which the ends 5a of the two sides or arms 5b are bent inwardly towards each other. The cavity in the intermediate section of the bearing rail represents a longitudinal corrugation 5c of inwardly tapering trapezium-shaped cross-section. The threaded shanks of the cap screws 8 which may, for example, have a lenticular head, are passed through coaxial holes provided in the webs 7a of the connecting rails 7 and in the base areas of the longitudinal corrugations 1a, 1b and 1c of the section-rails 1, nuts 9 being then screwed on to the threaded shank ends extending into the longitudinal corrugations 5c of the bearing rails 5, so that the nuts 9 are countersunk in the longitudinal corrugations 5c. The heads of the connecting screws 8 may be prevented from projecting from the inside of the side wall by providing the webs 7a of the connecting rail 7 with cup-shaped cavities (not shown) in the drawings) in which the heads of the holding screws 8 may be received.

The side upper border of the side wall is formed by a section rail 2 of a special construction, the lower section of its lateral edge being constructed as a longitudinal corrugation 2a, 2b, 2c of the same shape and dimensions as the longitudinal corrugation 1a, 1b, 1c provided in the lower edge of the indivi-

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dual section rails 1. Exactly as in the longitudinal corrugations 1a, 1b, 1c of the section rails 1, the upper arm 1d of the next lower section rail 1 and a U-shaped connecting rail 7 of the construction hereinbefore described are inserted into the longitudinal corrugation 2a, 2b, 2c. All of the three parts, that is the upper border rail 2, the adjoining section rail 1 and the connecting rail 7, are secured by cap screws 8 and nuts 9 to the upper ends of the bearing rails 5 in the manner hereinbefore described.

The intermediate section of the upper border rail 2, which section is disposed in the same plane as the web 7a of the connecting rail and the wall sections of the intermediate section rails 1, extends into a section 2d bent at right angles and terminating in a C or U-shaped curvature.

The C or U-shaped section 2d of the upper border rail 2 engages over the bearing rails 5 and projects to the outside of the side wall thus performing in known manner the function of a skirting rail for protecting the side wall, and particularly the top lateral edge thereof.

The front and rear walls of the platform superstructure are terminated at the top by an S-shaped section rail 10, as shown in Figure 7. The bottom part of the S-shaped section rail 10 forms a longitudinal corrugation 10a, 10b, 10c corresponding to the longitudinal corrugation 1a, 1b, 1c of the hollow section rail 1 and to the longitudinal corrugation 2a, 2b, 2c of the upper border rail 2. The S-shaped border rail 10 is detachably connected to the uppermost section rail 1 of the front and rear walls of the platform superstructure by means of cap screws 8 and nuts 9 and an intermediate connecting rail 7 in the same manner as the border rails 2 forming the skirting rails are secured to the side walls of the platform superstructure. The upper end arms 10d of the S-shaped border rail 10 may advantageously be of a sharply bent construction, so that the inclined half 10d' of the arm seals the cavity enclosed by the upper S-bend of the section.

The lower borders of the side and cross walls of the platform superstructure are formed by a section rail 3, the top section of whose lateral edge is constructed as a dovetail shaped longitudinal corrugation 3a, 3b, 3c having a long upper arm 3b and a short arm 3c. The upper arm 3b is applied to the inside of the upper arm 1b of the longitudinal corrugation of the next section rail 1, so that it rests against the bottom surface 1a of the longitudinal corrugation 1a, 1b, 1c. The short lower arm 3c encloses the downwardly directed lower arm 1c of the longitudinal corrugation 1a, 1b, 1c of the section rail 1. The web 3a of the longitudinal corrugation 3a, 3b, 3c of the lower border rail 3 rests firmly against the front edge of the upper arm 1c of the longitudinal corrugation 1a, 1b, 1c of the section rail 1. With the longitudinal corrugations thus interengaging, the lower Border rail 3 and the next section rail 1 are secured to the bearing rails 5 by cap screws 8 and nuts 9 without any connecting rail 7.

The lower arm 3b of the longitudinal corrugation 3a, 3b, 3c of the lower border rail 3 extends into a downwardly directed rail section 3d passing into an arm 3a which rests on the chassis 4 of the vehicle and seals the side wall against the chassis of the vehicle.

Figures 1, 2 and 3 show the connection of the arm 3a in hinged side walls. In Figures 1, 2 and 3, the chassis of the vehicle is assembled from rails 12 of Z-section having a curved external arm 12a of semicircular section. The chassis rails 12 of the two individual sides of the chassis and the rear end thereof are provided at at least two positions with rectangular apertures in the zones of which the hinges of the side walls are inserted. In the construction shown in Figures 1 and 2, the hinges consist of U-shaped bearing brackets 13 welded into downwardly open cavities of the aforementioned apertures provided in the rails 12 of the chassis. The hinge eyes 6a engage between the arms of the bearing brackets 13. They are hinged to the arms of the bearing brackets 13 by hinge pins 14 and threaded nuts 15, if necessary or desired, with the insertion of bearing bushes.

In Figure 3, the hinge of the side wall consists of a hinge housing comprising the semi-circular external arm 12a of the rail 12 of the chassis and a filling element 16 inserted in the downwardly open cavity provided in the rail of the chassis. The bearing eye 6a is inserted so as to be rotatable directly in the cylindrical cavity of the hinge housing, that is to say without using a hinge pin and is secured against accidental axial displacements by one or more members (not shown).

In the chassis illustrated in Figure 1 to 3, the arm 3e of the lower border rail 3 of the side wall covers the curved outer arm 12a of the chassis section rail 12 along a circular arc of about 30°. The radius of the curvature of the arm 3e corresponds to that of the external arm 12a of the chassis rail 12. Upon swivelling of the side wall as it is folded down or returned upwards to the closed position, the arm 3e slides freely downwards or upwards on the outside surface of the external arm 12a.

In vehicles in which the platform superstructure has fixed side walls and a fixed front wall, the chassis 4 of the vehicles are generally produced from section rails of angular section (Figure 9). In this case, the connecting arm 3e of the lower border rail 3 is provided of a correspondingly sharply bent construction.

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When the wall of the platform superstructure which wall is assembled from a plurality of individual section rails 1, 2, 3 and may be taken apart, is required to be liquid-tight, this requirement may be met as illustrated in Figure 6 by inserting sealing strips 17 made of rubber or the like in the gaps between the arms 7b, 7c of the connecting rail 7 and the arms 1b, 1c of the section rail 1, the sealing strips being provided with beaded lateral edges 17a preferably disposed forwardly of the gaps. It will be understood that such sealing strips 17, 17a made of rubber may also be inserted in the gaps between the arms 7b 7c of the connecting rail 7 and the arms 2b, 2c of the longitudinal corrugations 2a, 2b, 2c of the upper border rail 3 and between the arms 3b, 3c of the lower border rail and the arms 1b, 1c of the longitudinal corrugation of the lower border rail.

It may sometimes be desirable for the height of the side walls of commercial vehicles to be increased for specific goods. A connecting section rail 18, as shown in Figure 8, may be provided for this purpose. It has a shape similar to that of the rail 3 shown in Figure 9, for sealing the lower edge of the side wall against the angular section rails 12 of the chassis 4 of the vehicle. The bottom edge section of the connecting section rail 18 is cranked at the position 18a in the opposite direction to the lower border rail 3 shown in Figure 9. As indicated in broken lines in Figures 1 and 2, one or more section rails 1 of which the shape and dimensions correspond to those of the section rails 1 used for constructing the side wall, are mounted on the connecting section rail 18, all of the section rails being then screwed to short bearing rails 5′ corresponding to the bearing rails 5 of the side wall. The lower end sections of the bearing rails 5′, which sections project from the extension wall, are introduced into openings provided in the top surface 2d of the border rail 2, their front ends being applied to the bearing rails 5 disposed below them. The extension wall is connected to the side wall so as to be readily detachable by holding screws not shown in the drawings.

The assembled side wall illustrated in Figure 10 comprises a section rail 1, an upper connecting rail 2, the free end of which forms a skirting rail, and a lower border rail 3. The rails 1 and 2 are provided at their lower ends with a longitudinal corrugation of trapezium-shaped section whose sides or arms 1b and 1c converge in the direction of the base 1a of the corrugation. The upper ends 1a′, 1b′, 1c′ of the rail 1 and of the rail 3 respectively engage in these corrugations. The ends 1a′, 1b′, 1c′ are bent back to correspond to the cross-sectional shape of the corrugation so that they fill the adjacent section rail as they rest in that corrugation.

The section rails are detachably secured by means of screws 8 and nuts 9 to hollow section rails 5 extending transversely of the longitudinal direction of the wall. Welded into the rails 5 are flat-iron rails 6 whose sections disposed below the side wall are rolled into hinge eyes 6a. The hinge housing comprises a semi-circular external arm 12a of the chassis rail 12 and a filling piece 16 inserted in the cavity of the chassis rail, which cavity is open at the bottom.

The rail bordering the extension wall at the top may be formed either by an upper border rail 2 of skirting-rail construction, as shown in Figure 1, or by an S-shaped section rail 10 of the construction shown in Figure 7 bordering the front wall and/or the rear wall of the platform superstructure at the top.

The surfaces of the sections used for the assembly of the wall, particularly when they are made of metal, are subjected to a corrosion-preventing treatment before they are assembled.

WHAT WE CLAIM IS:—

1. A commercial vehicle platform wall assembled from at least two longitudinal section rails made of metal or of a synthetic resin, in which one longitudinal edge of each metal or synthetic resin rail is provided with a continuous corrugation of trapezium-shaped section along the whole length of the rail, the sides or arms of the corrugation diverging in the direction of the opening, the other longitudinal edge being provided with one arm which extends parallel to the external arm of the longitudinal corrugation, said arm being slightly shorter than the external arm of the corrugation and being provided with an outwardly bent angular side edge, two or more section rails respectively being detachably interconnected by a connecting rail of open trapezium-shaped section whose arms of different lengths converge in the direction of the free ends, each connecting rail filling the cavity of the corrugation in which the single arm of the adjacent section rail is inserted so as to contact the external arm of the corrugation, the short arm of the connecting rail resting against the bent angular lateral edge of the external arm of the longitudinal corrugation, the longer arm of the connecting rail resting against the web of the longitudinal corrugation, its web forming an abutting surface for the heads of screws by which the section and connecting rails, held together by clamping action, are secured to bearing rails exending transversely of the longitudinal direction of the wall.

2. A wall according to Claim 1, in which the webs of the connecting rails inserted in the corrugations lie flush with the section rails.

3. A wall according to Claim 1, in which cup-shaped cavities are provided in the sur-

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face areas of the webs of the connecting rails which areas are contacted by the heads of the holding screws.

4. A wall according to Claim 1, in which rubber sealing strips, which may be provided with gap-sealing beaded edges, are inserted between the arms of the section rails and the arms of the connecting rails extending parallel to the arms of the section rails.

5. A wall according to Claim 1, in which the upper part of the section rail at the top of the wall is of S-shaped section, the outer convolution of the S-shaped section serving as a border which overlaps the upper ends of the bearing rails.

6. A wall according to Claim 1, in which the lower part of a section rail at the bottom of the wall forms an arm of angular, curved or rounded section having the same profile as an external arm of a rail of the chassis of the vehicle.

7. A wall according to Claim 5, in which a connecting section rail is mounted on the section rail at the top of the side wall of the vehicle and is provided with a cranked section to engage the border rail, the upper longitudinal edge section of the connecting section rail forming a corrugation of dove-tail section having arms of different lengths for the attachment of a further section rail.

8. A commercial vehicle platform wall assembled from at least two longitudinal section rails made of metal or of a synthetic resin in which one longitudinal edge of each metal or synthetic resin rail is provided with a continuous corrugation of trapezium-shaped section along the whole length of the rail, the sides or arms of the corrugation diverging in the direction of the opening, and in which the other longitudinal edge of each section rail is formed with an integral connecting rail means of hollow trapezium shaped section, the marginal portion of said other edge being bent back to correspond to the cross-sectional shape of the corrugation; two or more section rails being detachably interconnected by seating the connecting rail means of one section rail into the corrugation in the other section rail so that the connecting rail means fills the corrugation practically completely, the connecting rail means having an outer web forming an abutting surface for the heads of screws by which the section and connecting rails, held together by clamping action, are secured to bearing rails extending transversely of the longitudinal direction of the wall.

9. A wall according to Claim 8, in which the free end of the arm of the bent-back end of the section rail is wholly or partly welded to the section rail.

10. A wall according to Claim 8 or Claim 9, in which contacting parts of the corrugation and of the bent-back end associated therein is joined by an adhesive.

11. A commercial vehicle platform wall, substantially as hereinbefore described and illustrated in the accompanying drawings.

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Fig. 2

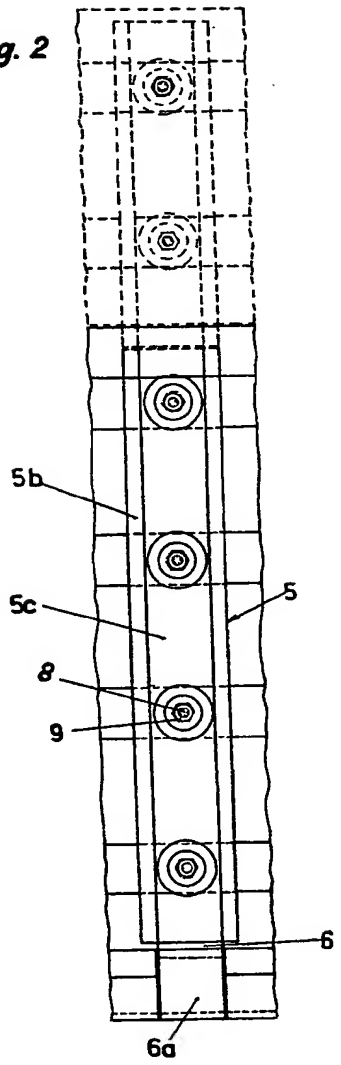

Fig.1

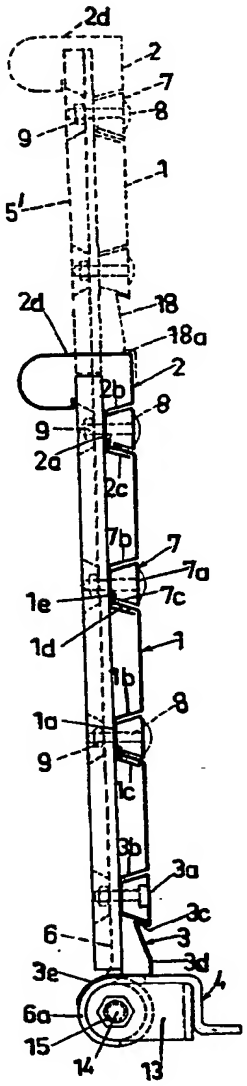

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Fig.5

Fig.4

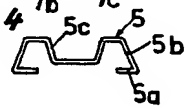


Fig.3

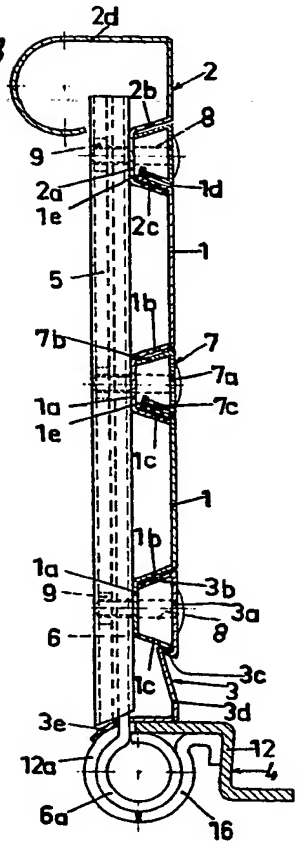


Fig.6

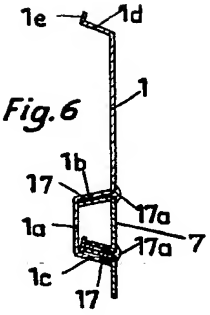


Fig.7

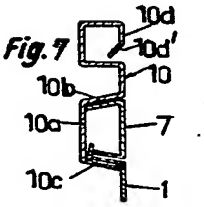


Fig.8

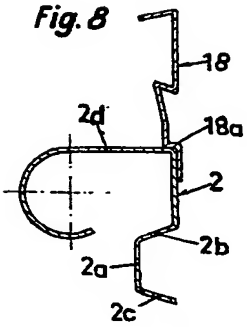
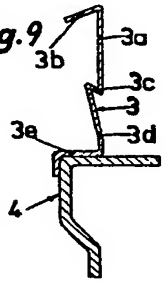


Fig.9



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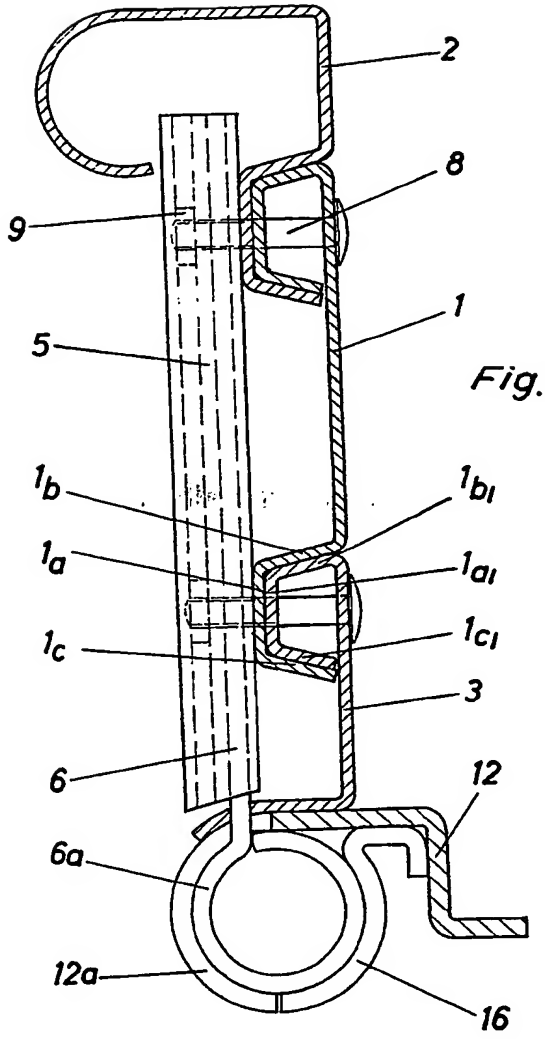

Fig. 10

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